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CLUSTER AND BUSINESS SUPPORT PROJECT

Promoting Feed Crop Production to Support the Livestock Sector in Kosovo

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Executive Summary

A major constraint facing the Kosovo livestock cluster is the susceptibility to high feed costs and dependence on imported complete feeds and/or raw materials. This situation has led to prohibitively high prices for Kosovar livestock (primarily poultry) producers several times during the last 4 years when regional and/or international stocks of raw materials were low. Generally, feed costs represent 50%-80% of the total cost of production. In Kosovo a number of the large poultry producers are major feed millers. Prior to 2003, millers relied almost totally on imported maize and soybean meal, because locally produced feed raw materials were available in limited quantities. Beginning with the former USAID-funded Kosovo Feed for Poultry Project (KFPP) implemented by IFDC in 2003/04, local production of high-quality maize feed grain; limited production of the newly introduced soybean crop; and forward contracting between farmers, millers, and poultry producers began to emerge. While much of the resulting domestically processed feed has been utilized within the poultry industry, a new market is emerging among the dairy producers where improved feed formulations are producing significantly higher milk production.

The Kosovo Cluster Business Support (KCBS) Project being implemented by Chemonics, with funding from USAID, will build on previous achievements and linkages to strengthen value-added market chains in the livestock cluster. The project will work through established trade associations thereby increasing institutional capacity and the chances for sustainability. Within the livestock cluster, KCBS will work with the Kosovo Agri-Input Dealers Association (KODAA) and Kosovo Development Association (KDC) to continue to promote efficient production of various feed grains, forages, and oilseeds for domestic feed production. Simultaneously, KCBS will work with producers and processors to improve quality and quantity of eggs, meats, and dairy products required by the Kosovar consumer. By focusing on all components of the value-added market chain, KCBS will help establish a competitive livestock industry.

The primary purpose of this consultancy was to work with KCBS staff and its partner trade associations (KODAA and KDC) to continue promotion of the proven technologies for increased maize and soybean production and to develop plans for identifying best management practices for other important feed crops such as forages and legumes. In addition, the consultant reviewed with the Peja Agricultural Institute and the Ministry of Agriculture, Forestry, and Rural Development results of 2004 programs and plans for 2005 activity to support improved feed crop production.

Discussions revealed that many progressive farmers have adopted improved maize and wheat varieties and efficient crop protection products. However, efforts to educate these same farmers and agri-input suppliers as well as the Peja Agricultural Institute, which is responsible for developing fertilizer recommendations, to the benefits of using high analysis phosphorus (P) fertilizers on feed crops, must continue. Efforts must also continue to identify best management practices for other feed crops (alternative legumes and oilseeds) and forages which could be economically grown and utilized by the livestock industry.

Promoting Feed Crop Production to Support the Livestock Sector in Kosovo

Introduction

As a result of United States Agency for International Development (USAID)-funded support to the agricultural sector, significant achievements have been accomplished in improving agricultural production in Kosovo. Initial activities centered on restarting agriculture and identifying improved technologies for traditional cereals (winter wheat and maize) production while exploring opportunities for crop diversification. Following these activities, USAID funded agricultural production, marketing, and business activities that promoted private sector development in the most promising agricultural sectors, including the livestock sector. As a result, linkages that promoted access to improved agri-inputs to produce the consistent delivery of high-quality grains along with limited quantities of oilseed by farmers to agri-processors for conversion to feed required by dairy, meat, and egg producers were initiated. However, efforts to consolidate and expand these linkages are required.

A major constraint facing the livestock cluster is susceptibility to high feed costs and dependence on imported complete feeds and/or raw materials. This situation has led to prohibitively high prices for Kosovar livestock (primarily poultry) producers several times during the last 4 years when regional and/or international stocks of raw materials were low. Generally, feed costs represent 50%-80% of the total cost of production. In Kosovo a number of the large poultry producers are major feed millers. Prior to 2003, millers relied almost totally on imported maize and soybean meal, because locally produced feed raw materials were available in limited quantities. Beginning with the former USAID-funded Kosovo Feed for Poultry Project (KFPP) implemented by IFDC in 2003/04, local production of high-quality maize feed grain; limited production of the newly introduced soybean crop; and forward contracting between farmers, millers, and poultry producers began to emerge.

The Kosovo Cluster Business Support (KCBS) Project being implemented by Chemonics with funding from USAID will build on previous achievements and linkages to build and

strengthen value-added market chains in the three primary clusters: livestock, fruits and vegetables, and wood products. Within the livestock cluster, efficient production of domestic feed grains and oilseeds will be a cornerstone for successful development and sustainability of the cluster.

In 2003 and 2004, demand for local feed grain raw materials by the domestic feed milling industry resulted in good prices for the surplus production of maize and soybeans (limited production in 2003). However, in October 2004 the tax law was changed to allow tax-free entry of imported complete feeds, whereas other imported components (maize, premixes, minerals, and salts) required to produce complete feed in-country remained taxed. Because the full impact of this measure will be felt in 2005, it is being closely followed by the Ministry of Agriculture, Forestry, and Rural Development (MAFRD); Ministry of Finance; and the Kosovo Association of Poultry Producers and Seed Manufacturers (SHPUK).

Assuming that the tax situation will be addressed in a way that will not hinder domestic feed grain production, KCBS is promoting scaling up the adoption of “best practices” for maize and soybeans by farmers and identification of best management practices for canola, alfalfa, and possibly other crops of interest (e.g., sorghum and red clover) in order to increase domestic production of quality grain, oilseeds, and forage for the entire livestock industry. In addition, KCBS will examine the economic feasibility of domestic production of all new crops, including soybean which was introduced in 2003, since this crop is by far the most cost-effective source of feed protein.

Widescale adoption of proven yield-enhancing crop production activities will provide numerous benefits including: (1) production of marketable surpluses from Kosovar farms, (2) support for improved feed rations for all components of the livestock sector, and (3) establishment of an efficient domestic production of quality meat, dairy, and egg products. Ultimately, this would result in the Kosovar consumer having access to quality products at a more reasonable cost and increased the overall competitiveness of the domestic livestock sector relative to other regional players.

During the timeframe of April 6-20, 2005, the consultant worked with the KCBS Feed Production Specialist, Milazim Makolli, to assess:

- Conditions for the 2005 cropping season.
- Farmer adoption and availability of improved agricultural technologies (improved seed varieties, high-analysis fertilizers, and crop protection products).
- Public and private support for soil testing and extension activities needed for sustained increased agricultural productivity.
- Potential for integrating new crops (e.g., improved forages) important to the livestock sector into the current cropping systems primarily dominated by winter wheat and maize.

Findings and Recommendations

The results of the consultancy are reported by tasks identified in the previously approved scope of work and include findings and resulting recommendations for each identified task.

Task 1—Establishment of On-Farm Demonstrations

Assist KCBS's local partners (public and private sector) in establishment of on-farm trials for maize feed grain based on proven technology packages that promoted increased agricultural production. Trials will be conducted in each agro-ecological zone.

Finding(s)/Recommendation(s)—*KCBS will continue the promotion of new technologies and access to improved agri-inputs for feed crop production through technical and financial support for on-farm demonstrations. The 2005 maize demonstrations will be carried out by the Kosovo Agri-Input Dealers Association (KODAA) and the Kosovo Development Corporation (KDC) under a KCBS subcontract. In the future it is expected that such activities will be funded through the small grants program planned by KCBS. The maize trials will be conducted in four agro-ecological regions and will include sites with and without irrigation. In discussions with both organizations and their staffs, the locations, farmers, crop varieties, and plot sizes were finalized. In addition, the consultant met with Agim Deshisku, KODAA president, to discuss the 2004/05 winter wheat seed multiplication trials (600 ha) and the private sector organization's interest in fertilizer and soil testing. KODAA has hired an agronomist, Musli*

Musliu, to oversee its 2005 field trials, so both KODAA and KDC have experienced people in place to conduct the field activities. However, considerable support and oversight from KCBS's animal feed specialist, Milazim Makolli, will be required.

With the subcontracts being approved by Chemonics on April 11, establishment of the field trials must proceed quickly. Currently, there are seven identified improved varieties of maize that are known or expected to produce high yields. The identified varieties, including three new varieties that will be field tested for the first time, will be tested against the traditional maize variety NSSC 444. These varieties, as well as the majority of other agri-inputs (high-analysis fertilizers and efficient crop protection products) required for increased maize production, are available. However, visits to several agri-input suppliers revealed the high-analysis fertilizers, diammonium phosphate (DAP) and mono-ammonium phosphate (MAP), were not available. Inquiries to the dealers resulted in the reply that "the farmers are not demanding the product," while farmers complained "the agri-input dealers were purchasing the old fertilizer formulation 15:15:15." Some farmers stated that their winter wheat and maize crops' need for phosphorus (P) were not being met with this formulation. In 2004 dealers brought in 225 mt of DAP and MAP for spring planting and all of it sold despite it being 45% more expensive than 15:15:15. Also, in 2004 reports of adulteration of the imported 15:15:15 resulted in some agri-input dealers purchasing 8:24:16, which also sold well. However, in 2005 only one agri-input dealer was identified that was providing an NPK fertilizer consisting of nitrogen (N), phosphorus (P), and potassium (K) with higher P contents (10:30:20). Other dealers indicated they could obtain NPKs with higher P content, but one dealer indicated the current cost of MAP and DAP was his major reason for not purchasing.

While there has been a lag in the adoption of the high-analysis P fertilizers, adoption of urea and the improved varieties of maize is widespread. Every agri-input dealer visited had urea and one or more of the three high-yielding maize varieties (Pregia, Florencia, and Colombo) previously tested in Kosovo. In addition, the crop protection products (CPPs) previously tested for wheat and maize (e.g., Monosan) were available at every outlet.

Task 2—Identify Possibilities for Introducing New Feed Crops

Assist in design and establishment of field programs to identify best management practices for soybeans, canola, and alfalfa and identify data collection information required to assess economic feasibility of domestic production. Field site choices will be based on preliminary analysis of crop requirements (e.g., required growing season) as related to climate and other biophysical characteristics.

Finding(s)/Recommendation(s)—*In addition to maize, other crops to be tested this year under the KODAA and KDC subcontracts include soybean, sunflower, and alfalfa. There will be fewer varieties of these crops tested (soybean–3; sunflower–3 and alfalfa–3). Care will have to be taken in ensuring good inoculation of the soybean seed prior to planting. Soybean seeds have been acquired from Seed-Imex in Hungary, but the accompanying liquid inoculant was lost during transport. Efforts were underway to purchase additional inoculant, and the recommendation was made to try to obtain a liquid versus dry form. Previous experience in Kosovo has shown that liquid inoculants were easier to apply to the seed and resulted in higher numbers of nodules on the plant root. Higher numbers of nodules result in higher rates of N fixed for plant use.*

Since the introduction of soybeans in 2003, significant grain yield (~1/3) has been lost during harvest. Consideration should be given to working with a local mechanization expert to see if combine (contracted machines primarily) adjustments improve harvest recovery. Also, efforts should begin to see if other soybean varieties (forage vs. grain types) offer a possibility for incorporation of a legume into the current cropping system and/or providing a second crop as forage following harvest of winter wheat. Soybeans were initially introduced in North America as a forage crop in the mid-1920s, but grain production gained emphasis by the 1970s. In considering soybeans as a forage source, one should consider crude protein content as related to growth stage, total digestible nutrients, and fiber content. The major limitation to use of soybeans (especially emergency use) for forage is that few herbicides are approved for use on soybeans to be harvested for forage. Growth of a soybean crop (or other legume such as alfalfa) would improve overall soil fertility, water infiltration and use efficiency and provide significant N fertilizer (30-40 kg/ha) for subsequent crops.

Despite extensive testing based on improved varieties and better management, sunflower production did not prove profitable during the past 4 years of testing. Yields have doubled, but have increased less than 1 mt/ha and have suffered significantly from pest (bird) damage. Additionally, there is only one crushing facility (ALCON) in Kosovo and the crop price has been suppressed for several years. Up until 2003, much of the interest in growing sunflower was driven by ALCON providing credit for the sunflower seed and fertilizer with payment being due at harvest. With the removal of credit in 2004, farmers' interest in growing sunflower decreased significantly. The market for the output is currently limited. Consideration should be given to dropping this crop from future demonstration trials and replacing it with another crop such as sorghum, which has potential as a feed ingredient and is more tolerant of drought. Consideration should also be given to concentrating promotion efforts on other oilseed crops such as soybean and possibly canola. Soybeans produce meal with significantly higher nutritional value for livestock feed, whereas rapeseed/canola (depending on the variety) produces oil suitable for use as a machine lubricant or for the human diet.

Like soybeans, alfalfa is a legume that provides additional benefits for sustainable crop production (fixes nitrogen [N] for use by the subsequent crop and improves soil fertility) in addition to being a nutritious forage. Alfalfa is currently grown in Kosovo, but it is not managed intensively. At least one agri-input dealer had a supply of several sub-species of Medicago sativa. Despite its many attributes, there is concern about promoting widespread alfalfa production because it is difficult to grow. Alfalfa requires optimum soil pH and access to irrigation. Also, alfalfa is susceptible to yield and quality losses while drying in the field and mechanical losses during harvest. These factors make scheduling and harvesting difficult.

KCBS plans to bring in a forage expert in the near future, and their advice should be sought on the feasibility of growing alfalfa versus another legume crop (e.g., red clover). Also, there was considerable interest in including rapeseed/canola in the 2005 trials. Much of this interest is due to older varieties being previously grown in Kosovo in the early to mid-1980s. Efforts are underway to locate seed for possible fall planting, which will include varieties

(canola) that produce oils suitable for human diets as well as meal that could be incorporated into animal feed.

Task 3—Identify Soil and Plant Measurements Required to Assess Performance

Work with KCBS's crop production specialist to identify measurements and samples required during crop growth to gauge performance.

Finding(s)/Recommendation(s)—*For the field demonstrations being conducted by KODAA and KDC, it was decided that soil sampling would be done prior to planting and after harvest. The soils will be analyzed for pH, plant available P, potassium (K), and organic matter. Similarly, 80 soil samples from farmer's fields are being taken throughout Kosovo and analyzed for the same parameters. These analyses will clarify the status of P and K in Kosovo soils. Many of Kosovo's soils contain only moderate levels of plant available P. This situation, combined with increased use of high-yielding winter wheat and maize varieties that demand more P and the continued use of low-analysis P fertilizers, could result in depleted soil P levels that limit yields. Also, there is some concern within the Peja Institute that the recommendation for the use of fertilizers high in N and P without the addition of significant quantities of K for wheat and maize may deplete Kosovar soils of K. However, recent soil test results have shown that many soils contain high to excessive levels of K, suggesting that some farmers could forego addition of K fertilizers for a period and then concentrate on only adding the amount of K utilized by the crop. For those farmers whose soil contains "medium" levels of plant-available K, annual applications of K should continue. Other K fertilizers such as muriate of potash (KCl) would provide an economic source of K but some crops including maize and potatoes, which are important crops in Kosovo, are sensitive to large amounts of chlorides.*

Due to the inclusion of new varieties that may eventually be considered for addition to the National Seed List, a number of plant parameters will be taken. These include dates for planting, germination, flowering, and harvesting. Additional measurements specifically related to crop growth (germination percentage, plant height, number of leaves, etc.), quality (percent moisture, cob weight, etc.), and total yield will be recorded.

Task 4—Review Soil Testing Data to Determine Agricultural Areas Needing Lime

Review soil testing data including most recent soil pH data to identify areas where liming is needed. Make recommendations for resuming liming program as part of improved farm management practices as needed.

Finding(s)/Recommendation(s)—*In 2004, 35 soil samples from farmers' fields throughout Kosovo were analyzed for soil pH, plant-available phosphorus, and potassium. Results of those soil samples indicated that 20 of the 35 samples would be considered slightly to moderately acidic (pH 5.0-6.9). At the time a recommendation was made that any soils showing a pH <6.5 should be limed to improve grain and forage production. Acid soils where crops such as Irish potatoes would not benefit from liming and some crops such as watermelons and berries perform better on acid soils.*

This consultancy allowed for an in-depth review of an additional 150 soil pH tests conducted by the Peja Agricultural Institute and Pristina Agricultural Faculty in recent years. The Peja Institute analyzed 70 samples in 2002 from throughout Kosovo's agricultural regions. Twenty of those samples exhibited pH values <6.5 (1:1 soil:water extraction), suggesting that liming of these soil would increase crop productivity. The data from the Pristina Agricultural University indicated that only the Vertisols in the Samadraxhhe region exhibited significant acidity problems, but all of the soil samples were taken from a limited area within the Therande Municipality.

For acid soil amelioration, agricultural lime is the most cost-effective source. Effectiveness of a lime source is determined by three characteristics:

- *Neutralizing value (NV) which is an indication of the liming material's ability to neutralize soil acidity. Pure calcium carbonate has a NV of 100% whereas typically agricultural lime should possess an NV of >95%.*
- *Fineness—The finer the lime particles, the faster they react with the soils.*
- *Calcium and magnesium content—Agricultural lime contains calcium carbonate and little magnesium carbonate. If some of the soils in Kosovo need magnesium, then dolomitic lime would be a good source. In 2004 two local lime samples were tested as*

sources of Ca and Mg for poultry feed. The results of those samples need to be reviewed in terms of liming capability. For those farmers using calcium ammonium nitrate (CAN or NAG) as a source of N, lime (costly) is being inadvertently applied because CAN/NAG consists of approximately 20% calcium carbonate.

Task 5—Determine Soil-Testing Capabilities

Review current soil-testing capabilities at Peja Agricultural Institute and Pristina Agricultural University and make recommendations for updating facilities. Examine possibility of enlisting Kosovo's Agri-Input Dealers Association (KODAA)'s assistance in promotion of soil testing to farmer clients. Examine feasibility of agri-input suppliers and farmers using soil test kits and linking with Peja Institute or Agricultural University to obtain improved fertilizer recommendations.

Finding(s)/Recommendation(s)—*The soil-testing lab and equipment at the Peja Agricultural Institute has been well maintained, but most of the equipment is dated and the facility is in need of refurbishment. The Institute analyzes soil samples for pH; the major nutrients (N, P, K); and soil organic matter and provides fertilizer analysis for imported fertilizer samples taken by the Border Inspectors. Detailed discussion with the Institute's chemist, Bardh Begolli, revealed that the analytical procedures are sound but, due to the limitations in equipment, the analyses are primarily conducted by wet chemistry and gravimetric analysis. Considerable time was spent discussing the various extractants used to determine plant-available P. The Institute uses Mehlich II because this extraction allows for determination of several plant nutrients including available P and K. At the request of Mr. Begolli, the consultant provided all P-extraction methodologies commonly used, including the Bray P1 extraction which is better suited than Mehlich II for slightly acid soils and the Olsen P extract which can be used on all soils but is more commonly used on alkaline soils. The consultant suggested conducting a test where 20 slightly acid soils were extracted by Mehlich II and Bray P1 with the resulting values for plant-available P being compared. If no significant differences were found, the Institute could continue to use Mehlich II extract for slightly acid soils since it would reduce the workload and save analysis time.*

While the need for soil testing every 2-4 years is gaining support among the agriculture community, timely analyses to support commercial farmers receiving up-to-date soil analyses and fertilizer recommendations every 2-3 years is a concern. According to Mr. Begolli the Institute's lab is currently capable of doing 10 soil samples (40 analyses) per day. Considering the current facilities and staffing, this is a reasonable number. To improve turn-around time, additional glassware, equipment, and part-time staffing would be required. In 2002, the estimated initial cost for updating equipment for the Institute so that it could provide timely soil and fertilizer testing was estimated at €106,000. Since then an atomic absorption spectrophotometer has been purchased, suggesting that a complete update could now be done at a cost of approximately €100,000. Current staffing levels would be adequate except during the heaviest workload periods which would be February/March and October/November. The Institute currently charges between €5-€7 for soil and fertilizer analyses, which is reasonable and in line with other public institutions that provide similar services. Because the Institute is an organization located within MAFRD, this lab would be best positioned to provide unbiased formal fertilizer recommendation service to farmers. Due to time constraints, a follow-up visit to Pristina Agriculture University's Soil Science Lab did not materialize. However, the consultant had visited the lab in 2002, 2003, and 2004 and understands that equipment needs identified at that time have not been met. In 2002 estimates of equipment needs exceeded €190,000. In addition, this laboratory is organizationally located under the University of Pristina, which would make it more difficult to be a public sector service provider.

Discussions were held with the KODAA President regarding promotion of soil testing among farmers. Based on this discussion, the consultant will provide information on competitively priced soil-testing kits that provide reasonable in-field evaluation of pH and plant-available P and K. Interpretation of this information by a trained agronomist (currently employed by KODAA) could result in effective and economic fertilizer recommendations during the off-years (years when farmers do not rely on detailed soil analyses and fertilizer recommendations that would be provided by an organization like the Peja Agricultural Institute). KODAA has also expressed interest in having access to or providing services for rapid analysis for imported fertilizers. Last year a significant quantity of NPK fertilizer was imported that did not meet analysis. It is the consultant's opinion that this service should also be organized under

MAFRD and that the Peja Agricultural Institute would continue to be logical provider of such a service. As noted above, in late 2001/early 2002 a study commissioned by Crown Agents indicated that to update Peja Institute's lab facilities to provide such services with a high degree of accuracy would require approximately €106,000. Of course, funding such an endeavor (which is outside the scope of KCBS) has not proved easy; therefore, the recommendations of 2001/02 have not been implemented. Assuming the lab is eventually funded and fertilizer regulations developed by the 2001/02 study are enforced, MAFRD, the Ministry of Finance, and KODAA should discuss instituting a reasonable fee per metric ton of imported fertilizer to address some of the initial cost and to sustain operations.

Task 6—Review Current Fertilizer Recommendations

Review current fertilizer recommendations and prepare guidelines and specific steps for updating recommendations based on increasing use of high-yielding crop varieties and high-analysis fertilizers.

Finding(s)/Recommendation(s)—*A review of current fertilizer recommendations provided by the Peja Agricultural Institute for all crops grown in Kosovo indicates that suggested rates of applications for N and P are in line with recommendations for similar type soils cropped under similar conditions in Europe, Canada, and the United States. However, the recommended rates for K appear to be above the norm for some crops. Previous soil testing under IFDC-KFPP indicated that 21 of the 35 soils tested had high to very high concentrations of plant available K. In the soils with high to very high reserves of K, farmers could forego annual application of K fertilizer until soil tests indicated soil K reserves were beginning to decrease. At that point, farmers would need to supply annual K in amounts removed by the crops. One explanation for the current high K recommendation for some crops (e.g., maize) is that all crop residues are removed from the field. This action prevents the return of K to the soil via leaching and decay of residue, a common practice in no-till systems that allows for recycling of some nutrients, particularly K.*

The Peja Agricultural Institute recognizes that the economics of applying the recommended rates or near the recommended rates with the commonly available fertilizers

(15:15:15 and CAN) are not favorable. For example, the fertilizer recommendation for maize is 130 kg N/ha, 95 kg P₂O₅/ha, and 260 kg K₂O/ha. To apply the recommended rate of N and P would require €112 using urea and DAP. Assuming the recommendation for K was correct, an additional €30 for high-analysis K fertilizer would be required for a total of €142. Based on the traditional practice (400 kg/ha of 15:15:15 basally applied followed by 100 kg N/ha of CAN), the fertilizer cost is €151/ha, but only two-thirds of the recommended rate of P and one-fourth of the recommended rate for K is added. However, based on soil tests many maize (cereal) farmers could maximize economic yield by using urea and DAP annually (€112) and adding smaller dosages of K equal to that amount removed in each crop.

The Peja Agricultural Institute is currently developing new fertilizer recommendations, but these are primarily based on higher analysis NPK fertilizers as opposed to the current recommendations based on the traditional practice of basally applying the NPK 15:15:15 and then topdressing with CAN. Despite several years of field trials showing the production benefits of using urea and di- or monoammonium phosphate (DAP or MAP) for cereal crops, the Peja Agricultural Institute continues to support using multi-nutrient NPK fertilizers and topdressing with CAN. This is primarily driven by concerns about depleting soil K levels and increasing soil acidity. However, the consultant and others have pointed out that such situations can be avoided through soil testing.

Task 7—Discuss With the Ministry of Agriculture and Rural Development Plans for the 2005 Field Programs

Discuss with Ministry of Agriculture and Rural Development extension plans and identify collaborative areas of activity.

Finding(s)/Recommendation(s)—*Discussions with MAFRD revealed that 2004 field trials on wheat, maize, and soybean utilizing the latest technologies produced significantly increased yields as compared to the 2004 average for all of Kosovo (improved varieties, urea and DAP fertilizers, and efficient crop protection products). MAFRD confirmed that there continues to be a need for assistance in promoting technologies for growing and harvesting soybean. The year 2004 represented only the second year that soybean production trials had been widely conducted in Kosovo. Many farmers are just beginning to become familiar with this*

crop, its management, and the demand by the livestock industry. If losses during harvest can be significantly reduced and one considers the benefits of having a legume in the cropping system, soybean production in Kosovo should be economical.

Yields for the MAFRD field trials for wheat and maize were 5.2 mt/ha and 7.2 mt/ha, respectively, as compared to Kosovo's average of 3.8 mt/ha and 4 mt/ha. Yields from MAFRD's 16 soybean trials averaged 2.8 mt/ha in 2004, but would have exceeded 3.6 mt/ha if harvest losses due to equipment problems had been successfully addressed.

In 2005 MAFRD will conduct 90 field trials, which will be divided into 70 trials for maize and 20 trials for soybeans. MAFRD estimates that 80% of farmers participating in field trials in 2003/04 are using the new improved wheat and maize varieties for their 2004/05 crops. The major supplier of improved maize varieties in Kosovo increased his seed purchase by 7,000 bags to 19,000 bags for the 2005 cropping season. This is partly due to farmers adopting the use of the maize variety "Pregia" for silage as a second crop following winter wheat.

Additional Issues Affecting the Feed Crops and Livestock Sector

Other relevant findings and recommendations that resulted from the consultancy but were not specifically addressed in the SOW are as follows:

- It is accepted that Kosovo will not be self sufficient in soybean production. At best domestic production could meet 40%-50% of demand by the Kosovar livestock industry. Therefore, it is recommended that SHPUK, on behalf of its feed millers and poultry producers, explore joint purchases with other poultry producers in the region. SHPUK and the Alliance for Kosovo Agribusiness (AKA) have an existing working relationship with sister trade associations in Albania. Neither country alone imports sufficient quantities to attract the interest of major international suppliers, but Albania has recently qualified for a GSM 102 USDA loan guarantee program that will provide credit guarantees with U.S. banks. This action should increase the possibility for direct purchases of feed grain by Albanian businesses. While Kosovo buyers would not benefit directly from this program, increased activity in Albania might offer more opportunities for joint purchases of soybean meal to achieve economies of scale. Under a United States Department of Agriculture (USDA)-

funded program in Albania, a local organization will be conducting an economic assessment of the possibility for direct imports of maize and soybean for the region from three regional ports—Durrës, Bar, and Thessalonica.

- KCBS should consider immediate technical and financial support to establish lab capabilities for livestock disease testing. One poultry operation visited during this trip was not practicing biosecurity measures. While most commercial Kosovar producers follow a regular immunization schedule and utilize some level of biosecurity, the danger of widespread poultry disease from free range chickens and spent hens should not be underestimated. So far Kosovo has been fortunate considering that diseases (Newcastle and Salmonella) have been widely reported in the region. Should disease gain a foothold, the entire Kosovo poultry industry would be dealt a setback that could require 5-10 years for recovery.
- Donors and farmers alike had originally anticipated that privatization of state-owned lands could possibly result in Kosovar farmers having an opportunity to expand land holdings. However, discussions with Kosovo Trust Authority (KTA) indicated there is considerable interest in state-owned farmland which may result in prices that exceed its value as farmland. If consolidation in land holdings does not occur, many farmers may eventually be forced to switch to more intensive crops (fruits, vegetables, etc.) which produce a higher return per hectare. In turn, increased dependence on imported feed could significantly reduce the competitiveness of the livestock sector.

Conclusions

Kosovo's commercial farmers and those aspiring to become commercial farmers, along with agri-input suppliers, are interested in maximizing economic yields. Therefore, the benefit of soil testing on a regular basis (every 2-4 years) to obtain up-to-date fertilizer recommendations by crop is gaining recognition. This practice, along with the rapid adoption by some farmers of improved crop varieties (wheat and maize), suggest these farmers are very interested in increasing marketable surpluses.

Farmers are also interested in identifying new crops that generate increased incomes as they experienced with the introduction of hybrid maize and wheat during the past 4 years. KCBS, through its partnership with KODAA and KDC, will continue to evaluate and demonstrate new varieties of hybrid maize for use as raw materials for animal feed. Also, the field demonstrations will include several varieties of recently introduced soybeans and sunflowers. Future plans call for possibly including canola, sorghum, and improved forages such as alfalfa or clover. All of these crops would support improved feed formulations for various components (poultry, dairy, beef) of the livestock sector.

However, it will not be enough to successfully grow the crop because each new crop, like the recently introduced soybean crop, will have to be economically viable. For example, following the 2005 soybean crop an economic analysis of soybean production, including the benefits soybeans provide as a legume to a cropping system, needs to be explored. In addition, opportunities for double-cropping wheat/soybean on irrigated fields (some soybean varieties can be planted as late as mid-June) as well as possibly using soybean for forage (particularly if drought reduces production) need to be investigated for inclusion in future economic analyses.

Annex 1. Wheat as a Second Crop for Kosovo

At the request of the USAID Office in Kosovo, the potential for growing wheat as a second crop was discussed with USAID staff Tim Hammond and Flora Afiri prior to the consultant's departure. This interest is in part driven by interest from a third party to purchase Kosovo wheat and by the considerable amount of storage capacity for wheat that exists in Kosovo. Some background information on wheat production explains that it will be impossible to get two crops of wheat during one year. Wheat is classified as winter or spring wheat based on flowering responses to cold temperatures. Winter wheat is planted in the autumn and is harvested in the summer. It requires a period of seedling exposure between 3-8 degrees Centigrade to develop the heads that ultimately contain kernels. This process is called vernalization. Spring wheat does not require exposure to cold temperature for normal development.

Winter wheat is planted in the fall in Kosovo and is harvested from late June to mid July. If the intent is having two crops of wheat per year, this action precludes the planting of spring wheat and harvesting in late summer or autumn. Kosovo grain/cereal farmers typically grow winter wheat and many are moving to a wheat-maize rotation on alternate years. Maize production based on the new technologies and demand from the livestock sector has been considerably more profitable than winter wheat. There are also benefits in terms of soil fertility and disease prevention in rotating crops. Diseases are more of a problem when farmers plant the same crop year after year.

Opportunities for planting a second grain crop after winter wheat are limited at the moment to forage crops (maize or soybean). The consultant recommends that after the winter wheat harvest, the possibility of growing a second crop of soybean or maize for silage may be the most economic solution. Second crops with value to the livestock industry are being studied for possible testing in 2005/2006.

Acronyms

€	Euro(s) (monetary unit)
AKA	Alliance for Kosovo Agribusiness
CAN	calcium ammonium nitrate
CPP	crop protection product
DAP	diammonium phosphate
IFDC	An International Center for Soil Fertility and Agricultural Development
K	potassium
KCBS	Kosovo Cluster Business Support
KDC	Kosovo Development Corporation
KFPP	Kosovo Feed for Poultry Project
KODAA	Kosovo Agri-Input Dealers Association
KTA	Kosovo Trust Authority
MAFRD	Ministry of Agriculture, Forestry, and Rural Development
MAP	monoammonium phosphate
N	nitrogen
NAG	calcium ammonium nitrate
NPK	compound fertilizer (nitrogen-phosphorus-potassium)
NV	neutralizing value
P	phosphorus
SHPUK	Kosovo Association of Poultry Producers and Feed Manufacturers
USAID	United States Agency for International Development
USDA	United States Department of Agriculture